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Notes on Potentilla.—II.

By P. A. Rydberg.

Another very natural group is that which clusters around *P. rivalis*. Watson acknowledged only three species, viz.; *P. supina*, *P. rivalis* and *P. Norvegica*. Lehmann has ten species, of which six are American. To these six should be added *P. Nicolletii* (*P. supina Nicolletii* Wats.), which is a fairly good species and also another, near *P. millegrana*, described in this paper.

The characters of the group are: an annual or biennial root, a terminal style which is curved above and considerably thickened near the base, small flowers, in which the petals seldom exceed the sepals, 5–20 stamens and small anthers whose two lobes are nearly spherical.

Potentilla paradoxa Nutt.; Torr. & Gray, Fl. N. Am. 1: 437. 1838.

P. supina Michx. Fl. Bor. Am. 1: 304. 1803. Not L.

It has been regarded as a form of the European *P. supina*, and we still find it under that name in our manuals, notwithstanding the fact that the principal distinction has been known since the time of Nuttall. It resembles *P. supina* in the leaves, which are pinnate with several pairs of leaflets, but differs from it not only by the swollen corky attachment of the achene, but also in the stouter and more upright habit, the larger and coarser leaflets and a truly cymose inflorescence. It ranges from New York to Montana and New Mexico.

POTENTILLA NICOLLETII (Wats.) Sheld. Bull. Geol. and Nat. Hist Surv. Minn. 7: 16. 1894.

P. supina Nicolletii Wats. Proc. Am. Acad. 8: 553. 1873.

This is much nearer the European *P. supina*, having the same prostrate habit, small leaflets and falsely racemose inflorescence, but the achenes are of the same structure as in *P. paradoxa*. Only the basal leaves have several more or less distant pairs of leaflets; the lower stem-leaves have generally two approximate pairs, and the rest are ternate. It is a rather rare plant. The following specimens have been examined:

Minnesota: C. A. Geyer (Nicollet's Exped.), no. 361, 1838 (type); *Missouri*: B. F. Bush, 1893; *Iowa*: Hitchcock.

POTENTILLA RIVALIS Nutt.; Torr. & Gray, Fl. N. Am. 1: 437. 1838.

This differs from the preceding by its upright habit, cymose inflorescence, small petals which are scarcely half as long as the sepals, and achenes without any swelling on the inner side. The leaves are generally pinnate with two pairs of approximate leaflets, except the upper ones, which are ternate. Occasionally, especially in depauperate specimens, all the leaves are ternate, when it is very difficult to separate it from the next. The range is from Oregon and Montana to Mexico. All specimens named *P. rivalis* I have seen from the prairie States, except one from the stock-yards of Chicago, belong to the following species:

POTENTILLA MILLEGRANA Engelm.; Lehmann, Ind. Sem. Hort. Bot. Hamb. 1849: Add. 11. 1849.

This, as well as *P. pentandra*, have been regarded as varieties of the preceding. I think it is better, however, to consider them species. In *P. millegrana* all the leaves are, as a rule, ternate. The plant is much branched, with divergent branches and in the typical form spreading. This habit and the smaller, nearly white achenes separate it from forms of *P. rivalis* with ternate leaves. The plant is generally also more glabrate. It has a wide range, but is not a common plant. It extends from Illinois to New Mexico, California and Washington.

POTENTILLA LATERIFLORA n. sp.

P. millegrana lateriflora Engelm. Mss. in herbarium.

Annual or biennial; stems often several from the root, 3–5 dm. high, terete, finely and rather densely glandular-pubescent, often tinged with red or purple, simpler than in related species and with erect branches. Stipules small, ovate or oblong, entire or toothed. Leaves all ternate, the lower on petioles 2–10 cm. long, more or less hairy; leaflets broadly obovate, coarsely crenate, 2–4 cm. long and 1–3 cm. wide. Flowers small, about 5 mm. in diameter, on pedicels 5–15 mm. long from the axils of upper leaves, making the branches resemble leafy racemes. Calyx glandular-pubescent in fruit, about ½ cm. in diameter. Bractlets ovate-lanceolate or oblong, acute, a little shorter than the ovate, acute sepals. Petals yellow, obovate-cuneate, sometimes slightly emarginate, shorter than the sepals. Stamens about 10; pistils very numerous; style terminal, thickened and glandular at the base; ripe achenes whitish, smooth.

It most resembles *P. millegrana* and generally bears that name in our herbaria. Sometimes it is labelled *P. Norvegica*, which it resembles in the form of the leaf and general habit, but is a much more slender plant and has much smaller petals and fruiting calyx. From *P. millegrana* it differs in the simpler and erect stems, erect branching, falsely racemose inflorescence, broader and more hairy leaflets, and more glandular stems. Most specimens of what has been regarded as *P. rivalis millegrana* from the Pacific States belong to this species. It ranges from California and British Columbia to Assiniboia and Arizona. The following specimens have been examined:

Utah: Henry Engelmann (Simpson's Exp.), 1859.

Arizona: Edw. Palmer, no. 143, 1877; E. O. Wooton, 1892.

Nevada: Watson (King's Exp.), no. 324, 1867, in part, viz.: specimens from Unionville.

California: Coville & Funston, no. 1763, 1891: Wilkes' Expedition, no. 1647; J. G. Lemmon, no. 85, 1875; S. B. Parish, no. 3153, 1894; M. E. Jones, no. 2700, 1881.

Oregon: J. H. Bartholf, no. 29, 1875; T. J. Howell, 1881.

Idaho: A. Isabel Mulford, 1892.

Montana: Mrs. Moore, 1894; P. A. Rydberg, 1895.

British Columbia: John Macoun, 1889.

Assiniboia: John Macoun, no. 10482. 1895.

POTENTILLA MONSPELIENSIS L. Sp. Pl. 499. 1753.

P. Norvegica L. Sp. Pl. 499. 1753.
P. hirsuta Michx. Fl. Bor. Am. 1: 303. 1803.
P. Norvegica and *P. Norvegica hirsuta* Am. auth.

This is the stoutest of the group. It differs from the related species with ternate leaves in the size of the petals and the fruiting calyx. The former about equal the sepals in length and the latter often becomes 1 cm. in diameter. It is also more coarsely hirsute. It extends from Labrador to the District of Columbia westward across the continent.

The European form has generally a finer pubescence and oblong rather than obovate leaflets. It is occasionally met with in the East.

Potentilla Labradorica Lehmann, Ind. Sem. Hort. Bot. Hamb. 1849, Add. 12, has generally been included in *P. Monspeliensis*. From Lehmann's description it seems quite distinct, differing in being very low, 1–3-flowered, nearly glabrous, with leaves resembling those of *P. nana*, large stipules and larger flowers. I have not seen specimens.

POTENTILLA PENTANDRA Engelm; Torr. & Gray, Fl. N. Am. 1: 447. 1838.

P. pentandra is characterized by its leaves, which are digitately 5-foliolate or 3-foliolate, with the lateral leaflets cleft to near the base, by the exceeding numerous small flowers in a somewhat flat-topped cyme, by exceedingly small petals and generally only five stamens. It is often as stout as *P. Monspeliensis* and more bushy. Its range is from Missouri and Iowa to North Dakota and Arkansas.

The group *Multifidae* are perennials and have pinnate leaves with 2–7 pairs of deeply incised or pinnatifid leaflets, which are more or less white-tomentose beneath and greener above. All American species have a short terminal style, which in all except *P. pinnatifida* is thickened and glandular near the base. All except *P. Pennsylvanica* are spreading or ascending, with several stems from the perennial root.

POTENTILLA PENNSYLVANICA L. Mant. 1: 76. 1767.

P. Missourica Schrad. Linnaea, 8: Litb. 26. 1833.

There is some doubt whether this or the next is the true *P. Pennsylvanica* L. The description of the leaves seems to indicate rather the next species. The form represented by *P. Missourica* has been cultivated in Europe under the name of *P. Pennsylvanica*. The same form was also figured by Jacquin, in his Hort. Vind. 2: *pl. 189*, under that name. Dr. Lehmann held that Jacquin's figure represented the typical Linnaean species. Torrey and Gray, in Fl. N. Am., regarded *P. Missourica* as a synonym of the typical *P. Pennsylvanica*. I have therefore accepted that name for this very variable species.

P. Pennsylvanica is generally erect, 4–8 dm. high and more or less woolly tomentose. The leaves are truly pinnate, with 3–7 pairs of leaflets, which in the typical form are grayish tomentose beneath and nearly glabrous above, with broad oblong divisions and scarcely revolute margins.

The typical *P. Pennsylvanica* is a comparatively rare plant, ranging in British America from Hudson Bay to the Rockies, and in these extends southward to Colorado.

POTENTILLA PENNSYLVANICA BIPINNATIFIDA (Dougl.) Torr. & Fl. N. Am. 1: 438. 1838.

Potentilla bipinnatifida Dougl.; Hook. Fl. Bor. Am. 1: 188. 1830.

Segments linear, but their margins scarcely revolute; leaves white-tomentose beneath, more or less silky above.

It is more common than the species and of nearly the same range, but extends into Upper Michigan and Minnesota.

POTENTILLA PENNSYLVANICA STRIGOSA Pursh, Fl. Am. Sept. 356. 1814.

Stem with spreading hairs; segments narrow and with more or less revolute margins.

This is the most common form of *P. Pennsylvanica* found in the same range as the species, but also extending over the plains to Kansas and New Mexico. Also in northern Asia.

POTENTILLA PENNSYLVANICA ARACHNOIDEA Lehm. Nov. Stirp. Pug. 9: 41. 1851.

Plant in every part smaller; segments short; stem arachnoid-pubescent. Colorado, Utah and New Mexico.

POTENTILLA PENNSYLVANICA GLABRATA Wats. Proc. Am. Acad. 7: 554. 1872.

Low, stem puberulent or glabrate; leaves nearly glabrate and the sepals more distinctly veined. Perhaps distinct. Nevada, Montana and Assiniboia, in the higher mountains.

POTENTILLA LITORALIS.

Stem decumbent or ascending, 2–4 dm. long, simple, slightly appressed silky strigose. Lower stipules lanceolate, scarious and brown, the upper ovate, green, more or less toothed. Leaves pinnate, of two approximate pairs of leaflets, the lower pair the smaller, or subdigitately 5-foliolate, grayish tomentose and veiny beneath, nearly smooth above. Leaflets obovate, divided to near the mid-rib into linear oblong obtuse divisions. Calyx strigose and slightly tomentose, in fruit about 8 mm. in diameter. Bractlets lanceolate-oblong, nearly equalling the ovate triangular sepals. Petals obovate, cuneate, truncate or slightly emarginate, about equalling the calyx; stamens 20–25; style short, terminal, thickened and glandular at the base; achenes smooth.

A near relative of *P. Pennsylvanica*, but differs in the ascending or spreading stem, the sparser pubescence, the leaves, which have fewer and approximate leaflets, often almost digitate, and the sepals which are more distinctly ribbed. *P. litoralis* is principally a beach plant, or at least growing near the coast, while *P. Pennsylvania* is an inland plain or mountain plant. The following specimens belong to *P. litoralis*:

New Hampshire: Oakes & Robbins (Isle of Shoals), W. M. Canby. *Maine:* Wm. Boott (Cape Elizabeth), M. L. Fernald. *Newfoundland:* Waghorne, no. 8, 1895. *Quebec:* J. A. Allen, 1881 (Shores of St. Lawrence). *Labrador:* J. A. Allen, 1882.

POTENTILLA MULTIFIDA L. Sp. Pl. 496. 1753.

This is a species which somewhat resembles *P. Pennsylvanica bipinnatifida*, but the plant is spreading or ascending, the leaves of only 2–3 pairs, their segments nearly filiform with revolute margins,

the stipules long-acuminate, scarious and brown, the sepals narrower and the style not thickened and glandular at the base. It is not rare in northern and alpine Europe and Asia, but I have seen only the following specimens from America.

Great Slave Lake: Miss E. Taylor, 1892. *Hudson Bay*: R. Bell, 1880.

POTENTILLA PULCHELLA R. Br. Ross' Voy. Ed. 2, 2: 193.

P. pulchella is generally a very small plant, tufted with many spreading items from the perennial root. The stems are generally less than 1 dm. long, but in one specimen seen fully 3 dm. The leaves have only two pairs of leaflets, and the terminal leaflet is generally sessile. It is generally quite hairy with long and yellowish white hairs. In general habit and flowers it comes near *P. Vahliana*, which has been mistaken for it; but the latter has always only 3 leaflets. Spitzbergen, Greenland, arctic coast of America, and Wrangle Island, off the coast of eastern Siberia.

POTENTILLA SOMMERFELTII Lehm. Del. Ind. Sem. Hamb. 1849: 6. 1849.

Closely resembles *P. pulchella*, but is still smaller and differs in the smaller flowers, the lack of the long hairs, and the stalked terminal leaflet. It is a native of Spitzbergen and Greenland, but one specimen at least has been collected on the American Continent. It was sent to Dr. Torrey from Dr. Hooker, but the collector's name does not appear on the label.

A neglected Species of Oxalis and its Relatives.

By JOHN K. SMALL.

The problem of drawing satisfactory lines between several species of *Oxalis* belonging to the group of which *O. corniculata* may be taken as the type, has apparently never been solved. Several forms of *Oxalis* exist in eastern North America, whose dispositions in our systematic works many botanists have not been able to understand satisfactorily. The plants referred to in this particular case are close relatives of *Oxalis corniculata* L., and have

usually been regarded by authors as forms or varieties of that species, but as often happens, the "forms" or "varieties" possess excellent specific characters which for one reason or another have been overlooked.

A study of the material in the herbaria of Mr. Eugene P. Bicknell and Columbia University, together with field observations during several seasons, have led me to the following conclusions;

There are two perfectly distinct species, native in eastern North America, which have been indiscriminately referred to the names *Oxalis corniculata* or *O. stricta*. *Oxalis corniculata* is thought to be a native of southern Europe or tropical America and appears to be circumtropical. It is introduced to some extent into temperate regions, and we know it as a common weed in some of our southern cities; normally it is a prostrate and creeping plant, commonly wiry and very characteristic in habit, quite distinct from its two native eastern North American relatives with which we are at present concerned.

Linnaeus defines* *O. corniculata* and *O. stricta*, giving as characters for the former; "caule ramoso diffuso, pedunculis umbelliferis, Hort. Cliff. 175" and Trifolium luteum minus repens etjam procumbens, Moris. hist. 2, p. 183, f. 2. t. 17. f. 2." For *O. stricta* he gives, "caule ramoso erecto, pedunculis umbelliferis, Gron. Virg. 161," and "Trifolium . . . corniculatum luteum majus rectum . . . , Moris. hist. 2, p. 184, f. 2. t. 17. f. 3." We notice that Linnaeus describes the habit of the two species as dissimilar, while the character of the inflorescence is recorded as the same in both, namely, "pedunculis umbelliferis."

What strikes one most forcibly in the case of our two eastern species is the great difference in the general habit of the plants and their more minute morphology; the lower stout and pale plant with umbel-like inflorescence, large columnar abruptly pointed pods and strigose pedicels is closely related to *Oxalis corniculata* although abundantly distinct. Its characters pointed to the Linnaean *O. stricta*, but to make sure, specimens of both the eastern American forms were sent to Mr. Edmund Baker, who kindly compared them with the originals in the herbarium of the British Museum of Natural History and reported that the plant

* Sp. Pl. 435.

with umbel-like inflorescence matched the original of *Oxalis stricta.*

This disposes of one species, but there now remains the plant which has posed as *Oxalis corniculata*, as a state of *O. corniculata*, as a variety of *O. corniculata* and as *O. stricta;* it is tall and slender in habit and of a bright green color, with cymose inflorescence, smaller and more gradually narrowed capsules and villous pedicels. I cannot find an available published name for this species, and the only indication that it was noticed many years ago is the figure 4, on plate CCXXI, of Dillenius' Hortus Elthamensis, the rest of the plate clearly being *Oxalis stricta.* This species may be designated *Oxalis cymosa.* I append a description of our two common species:

OXALIS STRICTA L. Sp. Pl. 435. 1753.

Annual, caulescent, normally low, stout, fleshy, pale-green, glabrous below, or more or less strigose. Stem simple and erect or usually branched at the base, the branches spreading, decumbent or ascending, 1–4 dm. long, rather fleshy, usually green; leaves 1.5–3.5 cm. in diameter, on petioles 3–9 cm. long; stipules a narrow scarious dilatation of the base of the petiole; leaflets broader than long, thick and fleshy, acutely notched at the apex, the cellular structure very prominent under a lens; inflorescence axillary, umbellate; peduncles rather stout, 4–15 cm. long; petioles 1–2.5 cm. long, strigilose, at length deflexed, subtended by linear-subulate bracts; flowers yellow, fragrant; sepals linear or lanceolate, about 5 mm. long, many-nerved, ciliolate, erect or ascending; petals somewhat spatulate, about 1 cm. long, many-nerved, more or less inequilateral, undulate, commonly reddish at the base, sometimes slightly emarginate at the apex; capsule columnar, 1.5–3 cm. long, abruptly narrowed at the apex; seeds obovoid or elliptic, about 1 mm. long, brown, angled, marked with interrupted transverse ridges, the base rather acute.

New England to Dakota and Colorado, south to the Gulf of Mexico.

OXALIS CYMOSA n. sp.

Annual, caulescent, normally tall, slender, rather wiry, bright-green, glabrous or somewhat villous. Stem simple at the base, more or less branched above, 1–7 dm. tall, erect or assurgent, rarely decumbent at the base, at length woody, somewhat grooved, reddish or brownish; leaves 1–5 cm. to usually 3 or 4 cm. in diameter, on slender petioles 3–7 cm. long; stipules almost wanting;

leaflets broader than long, acutely notched at the apex, usually thinnish, the cellular structure not prominent under a lens; inflorescence axillary, cymose; peduncles wiry or filiform, 5–10 cm. long; pedicels 5–8 mm. long, villous, erect or ascending, subtended by linear-lanceolate bracts; flowers yellow; sepals lanceolate or narrowly elliptic, 4–5 mm. long, obtuse or acutish, erect or at length spreading; petals obovate or somewhat spatulate, 7–9 mm. long, many-nerved, obtuse or emarginate at the apex; capsule columnar, 1–1.5 cm. long, gradually narrowed to the apex; seeds obovoid-oblong, 1.2 mm. long, marked with prominent continuous ridges.

Ontario to the Lake Superior region and Nebraska, south to the Gulf of Mexico. Flowers somewhat earlier than *O. stricta*.

There is another relative of *Oxalis corniculata* occurring in our campestrian territory that appears to need study. I have examined the plant in the field and in the herbarium during several years and am convinced that it is specifically distinct from all other forms.

Rafinesque apparently found this form many years ago and described it in his New Flora,* and Prof. Trelease has described† it as a probable variety of *Oxalis corniculata*. The following is a description of the species as I now know it.

Oxalis macrantha (Trel.).

?*Oxalis caespitosa* Raf. New. Fl. **2**: 27. 1836. Not A. St. Hill.

Oxalis corniculata var.? *macrantha* Trel. Mem. Bost. Soc. Nat. Hist. **4**: 88. 1888.

Usually perennial by horizontal rootstocks, stoutish or hirsute. Stems erect or assurgent, sometimes loosely tufted, 1–3 dm. tall, often becoming woody at the base, commonly leafy throughout, sometimes densely hirsute; leaves 1 cm. or usually 2–3 cm. broad, more or less silky-pilose; petioles filiform, 3–9 cm. long, pubescent like the stem; leaflets ciliate, sharply notched at the apex; peduncles filiform, exceeding the petioles; flowers bright yellow or golden, 2–2.5 cm. broad, 2–5 umbel-like at the ends of the peduncles; pedicels 1–2 cm. long, about as long as the flowers, subtended by linear-subulate bracts; sepals ovate or oblong, 6 mm. long, obtuse, minutely pubescent, 6–12 nerved, nearly erect, the tips sometimes spreading, petals nearly 1.5 cm. long, slightly notched at the apex; ovary glabrous or nearly so; styles villous;

* New Fl. 2:27. 1836,

† Mem. Bost. Soc. Nat. Hist. **4**: 88. 1888.

capsule columnar, 12 mm. long, abruptly narrowed into and tipped by the long (4–5 mm.) styles; seeds obovoid, 3-angled, 1.5 mm. long, marked with low broken transverse ridges.

Missouri to Georgia, Florida and Texas; ascends to only a few meters above sea-level.

Fossil Diatomaceae from Nebraska, and their Relation to modern Species.*

By C. J. Elmore.

Until very recently, fossil diatoms were scarcely known in Nebraska. In November, 1895, Dr. Barbour, professor of geology in the University of Nebraska, received some remarkably pure diatomaceous earth from Wheeler county. A little later he received some equally pure material from Mullen; and since that time a second deposit consisting of diatomaceous limestone has been found at Mullen, and a deposit of pure diatomaceous earth at Thedford. Some diatomaceous earth, largely calcareous, had been collected in Greeley county in 1887 by Mr. Russell and left with Dr. Bessey, but none of the species of diatoms that it contained had been identified.

Very little is known of these deposits. Dr. Barbour has not yet visited them, and the information that can be obtained from the collectors, who, in some cases at least, are the owners of the land on which the deposits occur, is very limited. Possibly the pure diatom deposits are of a sufficient extent to be valuable for commercial purposes, but this is somewhat doubtful.

The pure diatom deposit at Mullen consists of three layers. The middle layer contains practically nothing but diatom valves, while the top and bottom layers are mixed with considerable foreign matter. In the top layer six species were found that were not found in the middle layer, three of which are known in Nebraska only as fossil. In the lower layer only three species were found which were not found in the middle layer, all of which are common among modern Nebraska diatoms. It seems a little strange that the species in the lower layer should resemble mod-

* Read before Nebraska Academy of Sciences, January 3, 1896.

ern Nebraska species more closely than those in the top layer do. The species in all of these deposits show such a general resemblance to each other that it is likely that all the deposits were formed under the same conditions.

In these deposits 73 distinct species were identified, besides a number of so-called varieties not enumerated separately. Fifty-nine of these, according to De Toni Syll. Alg., are exclusively fresh-water species, 11 are fresh or submarine, 1 fresh or marine, 1 marine, and 1 submarine or marine. The last species, however, is found in Nebraska in fresh water. Only 28 of the species, according to De Toni, l. c., are known as fossil, leaving 45 species that have not been found before as fossil. A deposit in New Jersey, however, discovered by Dr. A. M. Edwards since the publication of the Sylloge Algarum, shows many of the same species that are found in these deposits. There is a striking similarity between the species found in these deposits and those now found living in Nebraska. Fifty-two of the 73 species are known to be living within the State; and considering that only a comparatively small number of the living diatoms of Nebraska are known, it is likely that nearly all of the fossil species are now to be found living in the region.

A comparison of these fossil diatoms with modern ones has led me to the conclusion that the term *variety* cannot be properly used in dealing with diatoms. The forms classed as varieties may be divided into two classes: (1) Conditions of some species, and (2) closely related species. Diatoms vary so greatly in form and size between one auxospore stage and the next that the same species may occur in many forms, all of which are but stages in the life-history of the organism. Many of these different conditions have been described as species, and have been reduced to the rank of varieties by later writers who saw more or less clearly their true relationship. But such conditions are not varieties any more than the prothallium of a fern or the protonema of a moss are varieties of the plants to which they belong. The other forms which are classed as varieties are merely closely related species. These fossil diatoms show the same species and the same variations from the species that modern ones do. If these variations are only temporary and return to the original form by the forma-

tion of auxospores they come under the first class. If they do not return to the original form, but have remained distinct from it since Tertiary times, they have certainly earned their title to the name *species*, and should not be classed as varieties. Evolution in diatoms since their first appearance as such is not easy to trace; in fact, there appears to have been none. Unless we can find in them evidence of continued evolution, we cannot consistently recognize varieties among them.

The following is a list of the species identified in these deposits:*

Abbreviations used in the list. (The data as to habitat, etc., are taken from De Toni, l. c.)

Fr. A freshwater species.

Mar. A marine species.

Subm. A submarine species.

Foss. A species known elsewhere as fossil.

Neb. A species that has been found living in Nebraska.

M. Found in the middle layer of the Mullen deposit.

M 1. Found in the top layer of the Mullen deposit.

M 2. Found in the bottom layer of the Mullen deposit.

L. Found in diatomaceous limestone at Mullen.

G. Found in Greeley county deposit.

W. Found in Wheeler county deposit.

T. Found in Thedford deposit.

Amphora ovalis Kuetz. Fr. Neb. Very rare. Probably the form represented by var. *gracilis* (Ehr.) in M. L.

Coconeis placentula Ehr. Fr. and Mar. Foss. Neb. T. M. W.

Cymatopleura elliptica (Bréb.) W. Sm. Fr. and subm. Neb. Only a fragment found. M2.

Cymatopleura solea (Bréb.) W. Sm. Fr. Neb. Not common. M2.

Cymbella cistula (Hempr.) Kirchn. Fr. Neb. Common, and quite variable. M. W. L. G.

Cymbella cuspidata Kuetz. Fr. Foss. Neb. Common. Some specimens measure 98 μ long. W. M. T.

* I am indebted to Prof. C. S. Boyer for examining my slides and for other suggestions.

Cymbella cymbiformis (Kuetz.) Bréb. Fr. Neb. Common. M. W. L. In the limestone at Mullen a form occurs like var. *parva* (W. Sm.). V.H.

Cymbella gastroides Kuetz. Fr. Foss. Neb. Common. M. T. G.

Cymbella inaequalis (Ehr.) Fr. Foss. Neb. Common. M. T.

Cymbella lanceolata (Ehr.) Kirchn. Fr. Common. M. L. G.

Cymbella levis Naeg. Fr. Rare. M.

Cystopleura gibba (Ehr.) Kuntze. Fr. and subm. Foss. Neb. Rather common. T. M. W. L. The form called var *ventricosa* (Ehr.) Grun. also occurs.

Cystopleura ocellata (Ehr.). Kuntze. Fr. Foss. Rather common. M1.

Cystopleura turgida (Ehr.). Kuntze. Fr. and subm. Neb. Quite common, as are also var. *vertagus* (Kuetz.) Grun. and var. *Westermanii* (Ehr.) Grun. M. W. L; var. *Westermanii* is cited (De Toni, Syll. Alg. **2**: 778) as fossil.

Cystopleura Zebra (Ehr.) Kuntze. Fr. and subm. Foss. Neb. Not very commom. M. W. L.

Encyonema caespitosum Kuetz. Fr. Neb. Rare. M.

Eunotia Arcus Ehr. Fr. Foss. Common. G. M.

Eunotia Diodon Ehr. Fr. Foss. Rare. M.

Eunotia formica Ehr. Fr. Rather common. G. A form reaching 225 μ in length resembling var. *elongata* Grun. occurs rather common at Mullen.

Eunotia lunaris (Ehr.) Grun. Fr. Neb. Common. M. L.

Fragilaria construens (Ehr.) Grun. Fr. Foss. Neb. Rather common. M. T. W. The form represented by var. *venter* Grun. is much more common, being the most common one in the Weller Co. deposits.

Fragilaria elliptica Schum. Fr. Common. W. M.

Gomphonema acuminatum Ehr. Fr. Foss. Neb. Not common M. Common G.

Gomphonema constrictum Ehr. Fr. Foss. Neb. Rather common. W. M.

Gomphonema gracile Ehr. Fr. Neb. Common. M. L. G.

Gomphonema herculaneum Ehr. Fr. Rare. M.

Gomphonema intricatum Kuetz. Fr. Neb. Common. G.

Gomphonema montanum subclavatum Grun. Fr. Neb. Rather common. W.

Gomphonema parvulum (Kuetz.) Rabenh. Fr. Neb. Not very common. M. T.

Gomphonema Turris Ehr. Fr. Neb. Common. M.

Gomphonema Vibrio Ehr. Fr. Foss. Rare. M. Common. G.

Hantzschia Amphioxys (Ehr.) Grun. Fr. and subm. Neb. Common. W. M. Var. *major* Grun. M1.

Melosira distans (Ehr.) Kuetz. Fr. Foss. Neb. Very common. M. L. G. W.

Meridion circulare (Grev.) Ag. The specimens evidently belong to *Meridion constrictum* Ralfs, but that is probably only a form of *M. circulare*. Fr. Foss. Neb. Rare. M.

Navicula ambigua Ehr. Fr. Neb. The specimens are all in "resting" condition, described by Van Heurck (Syn. 100) as forma *craticula*. No specimens in normal condition were found. L.

Navicula bacilliformis Grun. Fr. Neb. Rare. M. L.

Navlicula cuspidata Kuetz. Fr. Neb. This species occurs both in normal and "resting" condition. Not very common. W. M. L.

Navicula dicephala Ehr. Fr. Foss. Neb. Rare. M.

Navicula elliptica Kuetz. Fr. and subm. Foss. Neb. Rather common. M. M1.

Navicula Gigas (Ehr.) Kuetz. Fr. Not common. M.

Navicula Hungarica Grun. Fr. and subm. Rare. L.

Navicula Iridis Ehr. Fr. Neb. Varieties *affinis* (Ehr.) V. H., *amphigomphus* (Ehr.) V. H., and *amphirhynchus* (Ehr.) De Toni occur with the species. The specimens of the type are all rather small. W. M. L. T. Var. *amphigomphus* is the only form that De Toni, l. c., cites as fossil.

Navicula Legumen Ehr. Fr. Neb. Rare. M1.

Navicula limosa Kuetz. Fr. Neb. The specimens vary from the type, being as long as 95 μ, and scarcely inflated at the apices. Common. G.

Navicula nobilis (Ehr.) Kuetz. Fr. Foss. Rather common. M.

Navicnla oblonga Kuetz. Fr. Foss. Neb. Rather common. M. T.

Navicula parva (Ehr.). Fr. Neb. Not very common. M.

Navicula placentula (Ehr.) Kuetz. Fr. and subm. Foss. Found with var. *tumida* (W.Sm.). This species shows all variations from globose-capitate to slightly attenuate-rostrate. The specimens are larger than those described by De Toni (Syll. Alg. 2: 55) and have coarser striations. The globose-capitate forms seem not to be described, but they evidently belong to the same species as the attenuate forms. Common. L. M.

Navicula pupula Kuetz. Fr. Neb. Not very common. W. M.

Navicula radiosa Kuetz. Fr. Foss. Neb. Var. *acuta* (W.Sm.) Grun., is found with the type, from which it scarcely differs. Rather common. M2. L.

Navicula rostrata Ehr. Fr. Foss. Neb. Not very common. W. *Navicula sphaerophora* Kuetz, appears to be merely a form of *Navicula rostrata*. M.

Navicula serians (Bréb.) Kuetz. Fr. Foss. Neb. Rare. L.

Navicula trinodis inflata Schultze, occurs, but is rare. Fr. Neb. M.

Navicula viaidus (Nitz.) Kuetz. Fr. Foss. Neb. Not very common. M. L. G.

Navicula viridula Slesvicensis (Grun.) V. H. Fr. and subm. Neb. Rare. M.

Nitzschia amphibia Grun., and *Nitzschia Frauenfeldii* Grun., which seems to be merely a form of the former. Fr. Neb. M. G. L.

Nitzschia obtusa W. Sm. Fr. Common. L.

Nitzschia sinuata (W. Sm.) Grun. Fr. Not very common. L.

Nitzschia spectabilis (Ehr.) Ralfs. Subm. and Mar. Foss. Found in Nebraska in fresh water. Rare. L.

Nitzschia subtilis (Kuetz.) Grun. The form represented by var. *paleacea* Grun., occurs, but is rare. Fr. and subm. Neb. M. L.

Nitzschia vermicularis (Kuetz.) Hantzsch. Fr. Neb. Not common. M2.

Opephora pacifica (Grun.) Petit. Marine. This is the only species found in any of these deposits that has formerly been known as exclusively marine. Rather common. M. T.

Stauroneis anceps Ehr. Fr. and subm. Neb. Not very common. L.

Stauroneis minutissima Lagerst. Fr. Rare. M.

Stauroneis Phoenicenteron Kuetz. Fr. Neb. Rather common. G. M. L.

Suriraya spiralis Kuetz. Fr. Rare. M.

Suriraya splendida (Ehr.) Kuetz. Fr. and subm. Neb. Rare. M1.

Synedra capitata Ehr. Fr. Foss. Neb. Rather common. W. M. L. T. The form represented by *Synedra ulna longissima* (W. Sm.) Brun, seems rather to belong to this species. Not very common. M. W.

Synedra radians Kuetz. Fr. Rare. M.

Synedra tenuissima (Kuetz.) Fr. Neb. Rare. M.

Synedra ulna (Nitz.) Ehr. Fr. Foss. Neb. The forms called var. *amphirhynchus* (Ehr.) Grun. and var. *oxyrhynchus* (Kuetz.) V. H., occur, but not common. M. L.

Tabellaria fenestrata Kuetz. Fr. Very common. M.

Tetracyclus lacustris Ralfs. Fr. Foss. Rare. G.

Notes upon Maine Plants.

By F. L. Harvey.

The following plants found in Maine and not in Fernald's catalogue or supplement may be of interest to botanists. New localities for a few are added.

Geranium molle L. Common in the lawns on the college ground. Noticed for two seasons; apparently spontaneous.

Anthemis tinctoria L. This was found in Brewer, in 1887, by Rev. Mr. Merrill, and we have it from Mr. C. H. Gould, collected at N. Bridgton, where it was abundant in fields.

Hypochaeris glabra L. Has been found on the college grounds occasionally. We think Mr. Fernald found it in 1890 and it has been detected since. It should not be forgotten.

Lobelia leptostachys A. DC. We have a fine specimen of the species collected in an old field at Brownfield, Me., by Geo. Haley, probably brought in from the West in grass or clover seed. It possibly may gain a foothold.

Lythrum alatum Pursh. Collected at Bradford, Me., along the roadside by Mr. F. P. Briggs, is as worthy of record as *Silene dichotoma* and other plants recently introduced in Maine, and listed before sufficient time has elapsed to decide their spontaneity.

Mentha gentilis Smith. Jackman, August, 1895 (Harvey & Knight). This is given in Gray's Flora as a variety under *M. sativa*.

Polygonum lapathifolium nodosum (Pers.) Small. Jackman, August, 1895 (F. L. Harvey & O. W. Knight). Growing in a potato field.

Cyperus esculentus L. Is found on sandy shores of the Penobscot river about Orono. We believe it has not been reported from the Penobscot Valley.

Carex sterilis excelsior Bailey. Coast of Maine, 1893 (Harvey). Our specimens were determined by Professor Bailey. Professor Bailey regards this form as *C. stellulata*, *C. echinata* and *C. sterilis*. Boott var. *β*. (BULLETIN, November, 1893, p. 424). As these are not mentioned in Fernald's lists, we presume this form has not been recorded.

Festuca ovina pseudovina Hackel. Was collected in fields about Orono in 1892, by Mr. F. P. Briggs. The specimens were determined by Vasey, and are undoubtedly correct.

Agrostis canina alpina Oakes. Collected on Mt. Ktaadn in 1892 by F. P. Briggs, and determined by Dr. Vasey.

New Melastomaceae collected by Miguel Bang in Bolivia.

BY A. COGNIAUX.

TIBOUCHINA TETRAPETALA Cogn. sp. n. (sect. Pseudopterolepis).

Ramis petiolis pedunculis foliisque supra setis subadpressis breviter denseque vestitis; foliis parvis, rigidis, breviter petiolatis, ovato-oblongis, apice obtusiusculis, basi rotundatis, margine subintegerrimis, 5-nerviis, subtus brevissime denseque hirtellis; cymis brevibus, plurifloris, subcongestis; floribus 4-meris, satis parvis, sessilibus vel subsessilibus; calyce setulis arcte adpressis longiusculis eglandulosis dense vestito, tubo campanulato-oblongo, lobis

triangulari-subulatis tubo satis brevioribus; staminibus satis inaequalibus, omnibus connectivo basi breviter producto.

Rami satis graciles, obscure tetragoni, ferruginei satis ramulosi. Petiolus robustiusculus, 2–5 mm. longus. Folia patula vel subreflexa, supra intense viridia, subtus cinerea, 2–3.5 cm. longa, 1–1.5 cm. lata. Calyx viridi-cinereus, tubo 5 mm. longo, lobis erecto-patulis 3–4 mm. longis. Petala purpurascentia, anguste obovata, margine vix ciliata, circiter 1 cm. longa. Staminum filamenta glaberrima, 4 vel 6 mm. longa: antherae subrectae, 4 vel 5 mm. longae, connectivo infra loculus 1 vel 1.5 mm. longi producto. Stylus filiformis, 13–15 mm. longus.—(No. 2425.)

Cette espèce ressemble beaucoup au *T. Brittoniana* Cogn., dont elle diffère par ses fleurs tétramères, sessiles ou subsessiles, et non pentamères, assez longuement pedicellées, par sou calice á soies plus longues, etc.; elle doit se placer près du *T. parviflora* Cogn.

Diolena Boliviensis Cogn. sp. nov. Caule superne petiolis pedunculisque longiuscule subadpresse denseque setulosis; foliis in eodem jugo valde disparibus, breviter petiolatis, late oblongis, basi valde inaequalibus obtusisque, margine minute denticulatis, supra sparsissime longeque setulosis, subtus ad nervos densiuscule adpresse longeque setosis caeteris glabris, majoribus 7-plinerviis longiuscule acuminatus, minoribus 5-plinerviis breviter acuminatis; racemis terminalibus vel subterminalibus, submultifloris; floribus breviter pedicellatis.

Caulis ascendens, simplex, obtuse tetragonus, satis robustus, superne purpureo-violaceus, 2 dm. longus. Petiolus 2–4 mm. vel 1–3 cm. longus. Folia tenuiter membranacea, intense viridia; marjora 12–18 cm. longa, 4.5–6 cm. lata; minora 3–4.5 cm. longa, 11–17 mm. lata. Pedunculus communis 4–6 cm. longus; pedicelli erecto-patuli, 3 mm. longi. Calyx late obconicus, furfuraceo-puberulus, superne subsparse breviterque setulosus, 3 mm. longus. Petala alba, glabra, apice subrotundata, 8–9 mm. longa. Staminum filamenta 3 vel 3.5 mm. longa; antherae leviter arcuatae, majores 1.5 mm. longae, appendicibus erectis, capillaribus, 2 mm. longis. Stylus robustiusculus, apice uncinatus, 4–5 mm. longis. (No. 2574.)

Miconia undata Triana, var. robusta Cogn. var. nov. Tota robustior. Rami juniores satis compressi. Petiolus robustus, 2–3 cm. longus. Folia ut in var. *Boliviensis*, sed majora, basi breviore attenuata. Flores satis majores; calyx 2.5–3 mm. longus; petala 2 mm. longa. (No. 2343).

Miconia cyanocarpa Naud. var. hirsuta Cogn. var. nov. Rami petioli pedunculique setis patulis elongatis densiuscule hirsuti. Folia membranacea, usque 15 cm. longa et 8 cm. lata. (No. 2387).

Miconia Brittonii Cogn. var. glabrata Cogn. var. nov. Rami petiolique demum glabrati. Folia supra brevissime sparseque

strigillosa, subtus ad nervos nervulosoque brevissime sparseque setulosa, caeteris glabra. Calyx leviter furfuraceus vix hirtellus. (No. 2627).

MICONIA LASIOCALYX Cogn. sp. nov. (sect. *Amblyarrhena*). Ramis obtuse tetragonis, junioribus petiolis pedunculis foliisque subtus ad nervos brevissime denseque puberulis fere furfuraceis; foliis ovato-oblongis, breviuscule acuminatis, basi rotundatis, margine obscure denticulatis, breviter 7-plinerviis, supra brevissime subsparse adpresseque setulosis, subtus pilis brevissimis simplicibusque densiuscule puberulis; floribus 5-meris, sessilibus; calyce breviter denseque hirtello, dentibus brevissimis; antheris oblongis, apice biporosis; stigmate peltato.

Rami satis graciles, juniores cinereo-fusci. Petiolus satis gracilis, 2–3.5 cm. longus. Folia membranacea, subtus viridi-cinerea, 15–19 cm. longa, 6.5–8 cm. lata. Paniculae pyramidatae, circiter 1 dm. longae, ramis divaricatis. Calycis tubus campanulato-ovoideus, cinereus, 3 mm. longus. Petala late obovata, apice subtruncata, 1 mm. longa. Antherae 1 mm. longae. Stylus 3 mm. longus. Affinis *M. Costaricensis* Cogn. (No. 2344).

MICONIA VALIDA Cogn. sp. nov. (sect. *Cremanium*); ramis obtuse tetragonis, ad nodos non dilatatis vix compressis, junioribus petiolis foliisque subtus ad nervos pilis plumosis crispulis brevissimis dense tomentosis; foliis tenuiter membranaceis, ovato-oblongis, breviter acuminatis, basi rotundatis vel vix emarginatis, integerrimis, 5-nerviis, supra primum leviter furfuraceo-hirtellis praecipue ad nervos demum glabratis, subtus brevissime et densiuscule stellato-puberulis; floribus minutissimis, 5-meris, sessilibus; calyx ovoideo-campanulato, glabrato, distincte 5-dentato; antheris apice biporosis; stigmate peltato.

Rami robusti, cinereo-fulvi. Petiolus robustiusculus, 3–4 cm. longus. Folia supra laete viridia, subtus viridi-cinerea, 18–23 cm. longa, 8–11 cm. lata. Paniculae late pyramidatae, multiflorae, 7–8 cm. longae, ramis patulis, gracilibus, densiuscule breviterque hirtellis. Calyx fuscescens, 1.5 mm. longus. Petala suborbiculari-ovata, obtusa, leviter furfuracea, 0.6–0.7 mm. longa. Antherae vix 0.5 mm. longae. Stylus 2 mm. longus.—Species *M. plethoricae* Naud. proxima. (No. 2630.)

What is meant by Stem and Leaf.

BY EMILY L. GREGORY.

The difference between these two plant organs appears so evident that few persons would hesitate if asked to explain it. To

the botanist, however, the subject is not so simple. This is illustrated by the following paragraph which occurs in a recent number of the *School Review*: "It is unfortunate from a morphological standpoint that these organs of the Bryophyta should be called stems and leaves * * * this terminology being handed down from a time when the true homologies of the sporophyte and gametophyte parts were not well known."

It would seem from this paragraph that, while the ordinary observer would not hesitate to describe the organs of the moss-plant as stem and leaf corresponding to those of higher plants, the morphologist would give a different interpretation to their meaning, and even carry this so far as to prefer that other names be given them.

This opinion, expressed by the author of the above paragraph, is shared by many morphologists of the present day, and especially by one of our leading botanists, Professor Goebel. He says in an article published several years ago in the third volume of Schenk's General Botany, in speaking of the development of the higher from the lower, from thallus to the stem and leaf. "The attainment of a higher form in the different plant-groups has taken place in a similar or analogous manner, though it is an independent process in each plant group." He then compares the parts or members of *Caulerpa*, which resemble stem and leaf, with similar members in certain forms in the higher groups of plants, with certain of the Phaeophyceae, Florideae, and with the liverworts, ferns and phanerogams. Of these again he says, "We cannot say that these members are homologous, for example, liverworts and ferns are undoubtedly nearly related, but the vegetative form of the foliose liverwort is not the homologue of the leafy stem of the fern, but of the other generation, which has the form of a thallus; that is, the attainment of a stem and leaf in the asexual generation of the fern plant may have come about entirely independent of any inherited tendency or connection with the liverwort, simply by a series of changes from a thallus up to a stem and leaf, just as we have seen in the sexual generation of the liverwort. Here there is a gradual adaptation of the plant to its surroundings, till from a thallus form comes finally that of stem and leaf. The endeavor to find out how the different organs or members of the higher plants have originated must not take the start-

ing point that the different groups of plants form a continuous series from low to high, but, on the contrary, must start with the assumption that the origin of different organs must be sought separately in each large group of plants. For this reason it is very difficult to give a definition of leaf which will hold for every group, as the leaf of the liverwort is analogous to that of the fern and not homologous."

It is difficult to harmonize these statements of Goebel, for, on the one hand, he says the attainment of stem and leaf is an independent process in each large group of plants; on the other, that it is difficult to give a definition of a leaf which will hold for every group, because these organs are not homologues throughout the different groups but only analogues. If their attainment has come about independently in each group, why does he expect to find them homologues, or what has the question of homology to do with the conception of stem and leaf?

The writer of the present article was puzzling over this question in the laboratory of Professor Schwendener in the summer of 1894, and on asking him to explain it received the following explanation of his idea of stem and leaf. He first said that he did not share Professor Goebel's opinion regarding the idea of stem and leaf, for he saw no connection whatever with the question of homology. He then explained about as follows:

Suppose we examine a system consisting of main stem and branches or shoots: We find first a main stem which we may name I. On this arises another which may be called II. It is somewhat different from the first, smaller and less complex; this number II bears on it another which we may call III, and so on. There is no need so far for another name; this might be a branched thallus or a branched stem, the branches being the same in general character as the first or main branch, only they diminish in rank according to their distance from the main stem, so numbers do just as well as words to describe them. But when we come to the little outgrowths that appear on these branches then we find the need of another word or name. They differ from the stem, but are all of the same grade or rank, whether they are found on number I or II, or any other rank of stem. They generally arise from the point of vegetation in acropetalous order and are lateral

appendages of the mother organ. The stem must first be present, then comes the leaf. For this formation we must have a name, as we cannot consider it a stem of any grade or rank.

This may be still farther illustrated by the examination of a plant like *Nitella* or *Chara*. Here the main branch sends off side-branches which in turn develop other side-branches, but these differ in rank, the higher the number, or the farther its distance from the main stem, the smaller the branch. There is no difference in principle but only in rank, so there is no need for term leaf here. There is but one idea, the repetition of the main stem, but on a smaller scale.

This makes the idea of leaf and stem a fixed one which holds through all the different groups of plants. The fact that the *Blasia* thallus is not homologous with the leafy fern stem has nothing whatever to do with the idea of the leaf. This is entirely independent of phylogenetic considerations, has to do simply with the ontogenetic facts, consists either of stem and leaf, or thallus. According to Professor Schwendener also, the transition forms are not so distinct as Goebel makes them. As soon as a leaf-like organ appears, the mother organ is to be named stem; so in *Marchantia*, that which is ordinarily called thallus is really stem, as it is that member from which another member unlike itself originates.

This conception of the relation between leaf and stem not only obviates the difficulty to which Goebel refers in defining the word leaf, but agrees perfectly with the manner in which it is supposed to originate. Those who accept this view, therefore, find no inconsistency in retaining the word cormophyte, neither in the use of the terms stem and leaf as applied to the organs of the moss plant.

NEW YORK, June 1, 1896.

Botanical Notes.

CASSIA PROBOSCIDEA n. sp. Cassia sectioni Oncolobio pertinens, erecta, herbacea (?), glabra vel leviter glanduloso-pubescens. Foliola 4–5-juga, ovata, anguste acuta, marginibus ciliata, 1.5–3 cm. longa. Petiola basiglandulosa, glandulis hemisphericis, sessilibus.

Racemi terminales, pauciflori. Flores flavi, petalis oblongis, longitudine 1 cm. Antheri perfecti 6, duobus superioribus majoribus, filamentis quam alteris longioribus. Staminodia 3. Legumen glabrum, coriaceum, conspicuiter rostratum, cylindricum vel leviter compressum. Semina transversa, oblonga. Cotyledones plani.

Collected by J. F. Waby at Hastings, Barbadoes, April–June, 1895. (No. 24.) Type in the United States National Herbarium.

The basal petiolar gland and cylindrical pod containing seeds parallel to the dissepiments fix the position of this Cassia in Vogel's section Oncolobium, under which Bentham enumerates in his revision ten species.*

The plant is unique, however, in the possession of a pod tapering abruptly into a narrow proboscis-like beak, which occupies about one third of its total length. The pods of *Cassia Manzanilloana* Rose, from Mexico, exhibit a slight tendency to become rostrate; but the beak is never obviously developed. Mature seeds from the type specimen have been planted in the greenhouse, in the hope that the plant may be successfully cultivated and distributed.

CHARLES LOUIS POLLARD.
WASHINGTON, D. C.

Euphorbia Nicaeensis. A few days ago I visited the locality for this rare spurge, which was discovered near Vestal, N. Y., by Mr. C. F. Millspaugh in 1885. The plant is apparently increasing and grows luxuriantly, some stems being four feet in height.

On the day I saw it the plant was in full blossom, and looked at first glance like a field of Golden Rod nearly ready to bloom. It is found in greatest profusion about a lock of the abandoned New York and Pennsylvania Canal, and from thence has spread to the roadside and adjacent fields.

In the majority of the plants the floral leaves are greenish or yellowish green, but in some individuals this varies to deep yellow. In these the floral leaves are usually larger than in the others. Plants that are completely sterile, with floral leaves and no flowers, are also common.

The sixth edition of Gray's Manual gives Binghamton, N. Y., as the only station for the plant, but I understand it has since

* Trans. Linn. Soc. London, **27**: 530-535. 1871.

been found along the Susquehanna river at Athens, Pa., perhaps derived from the Vestal locality and carried there by the stream.

WILLARD N. CLUTE.

BINGHAMTON, N. Y.

Sisymbrium altissimum L. The Tumble Mustard has entered Michigan. The writer found over one hundred plants of this dreaded weed at Benton Harbor, Mich., June 13, 1896.

C. F. WHEELER.

Reseda lutea. We notice a reference in the June BULLETIN to *Reseda lutea* L., having been found in New Jersey.

In July of 1894 we collected specimens of this plant in meadows at East Windsor, Ct., on what could not have been ballast ground.

C. H. BISSELL.

Reseda lutea was collected by Miss Powers at Baldwins, Long Island, in 1895, and has been reported to me from Michigan, by Mr. S. H. Camp.

N. L. B.

Erythea. The editor of the "Journal of Botany," in referring (June issue, p. 280) to the part of Professor Greene's "Pittonia" recently distributed, makes a statement concerning "Erythea" which is about as accurate as his recently printed tabulation of the dates of publication of the BULLETIN during 1895. He says "Erythea, of which Prof. Greene was the moving spirit, seems to have come to an end, no number having appeared since December last." As the journal has been issued every month, this statement can only be understood by realizing that a restricted or insular notion as to the significance of "to appear" pervades the mind of the learned editor.

Reviews.

The Characeae of America. By Dr. T. F. Allen. Part 2, fascicle III. April, 1896.

This contains descriptions and illustrations of ten species of *Nitella*, two of which are new, *N. Leibergi* and *N. transilis.* The other species figured and described are *N. mucronata, N. capitellata, N.*

gracilis, *N. tenuissima*, *N. pygmaea*, *N. minuta*, *N. intermedia* and *N. Asagraeana*. The text is full of interesting quotations and notes, several of which ought to encourage the collection of rare or undescribed species in many familiar Eastern localities, notably Green Pond, New Jersey, and Nantucket, Mass. We note in the case of *N. Leibergi* the careful record made by the collector of the time and place of collection, but regret that this is not as exactly given in several other cases where it would be of great value. The illustrations are as handsomely lithographed, as Dr. Allen's always are, but we regret a certain indistinctness and irregularity of lettering which mars several of the plates. E. G. B.

The Bamboo Garden. By A. B. Freeman Mitford; illustrated by Alfred Parsons. Macmillan & Co., New York, 1896.

This is a work that will be welcomed by all plant lovers. It is a new departure in the way of ornamental gardening. Up to the last few years no one thought of introducing the bamboos into outdoor gardens; they were looked upon as belonging to the tropics, but the author has proved the possibility of making many varieties do duty as hardy plants.

The work is written for the more favored portion of the British Islands; there is no reason why it may not be just as useful in this country. On Staten Island several varieties have proved capable of resisting the cold of this latitude, and south of Washington many others would doubtless succeed if given a trial.

The author is an enthusiast and carries the reader along in a very pleasant way into believing as he does; he ridicules the attempts made of late years in copying a carpet, and other unnatural ways of planting for effect, advocates a return to the easy and graceful style of planting, and this he thinks can be helped by introducing the bamboo where available.

Altogether it is a very useful work, and will be much sought after as an authority on the subject, for he gives a list of more than fifty varieties of bamboos available for the temperate garden.

SAMUEL HENSHAW.

Monographie der Gattung Euphrasia. Dr. R. V. Wettstein. Pp. 316. *7 cuts. 14 pl. 4 maps.* Leipzig. 1896.

This exhaustive monograph touches on nearly every point of

interest connected with the genus *Euphrasia*. After an introduction and detailed discussions of the nomenclature, morphology and physiology, and a conspectus of the species, the author describes the species, giving much detail in regard to the time of flowering, geographic distribution and specimens examined, all followed by copious critical notes. Eighty-seven species and twenty-one hybrids are enumerated.

The excellent series of plates is divided between the anatomy, morphology and photographs of all the species, many taken from original specimens. The maps serve to show the geographic distribution of some of the species and larger groups of the genus.

Dr. Wettstein has divided *Euphrasia officinalis*, as generally understood by American botanists, into *E. Americana* Wett., *E. latifolia* Pursh, and *E. Oakesii* Wett., thus giving us three American species in place of one. *E. Americana* is said to extend from the region of the St. Lawrence River and the Great Lakes through Labrador; *E. latifolia* occurs on the coasts of Labrador and Greenland, and extends through sub-arctic and arctic Europe to Asia; while *E. Oakesii* is known from a single collection from the White Mountains, New Hampshire (not California as indicated by the author). We hope that Dr. Wettstein's interpretation of the American representation of the genus is more trustworthy than his geography. J. K. S.

Lehrbuch der Ökologischen Pflanzengeographie. Eine Einführung in die Kenntniss der Pflanzenvereine. By Dr. Eugen Warming. German edition by Dr. Emil Knoblauch. 8vo., pp. 412. Berlin. 1896.

In the arrangement of the subject-matter this work is original. It is, however, very probable that Drude's and Grisebach's works on plant geography and distribution gave the impulse for producing it. It also seems evident that the author was strongly influenced by the numerous comparatively recent investigations on symbiosis, which no doubt suggested many of his ideas in regard to plant societies.

Warming introduces the subject with a consideration of the ecological factors concerned in plant distribution. These are divided into direct and indirect (Schoum). In the former are in-

cluded the contour of the earth's surface, elevation, latitude, longitude, the effects of living and dead soil-coverings (grass, leaves), the activities of plants and animals in the soil, etc., etc. In the latter are included the influence of light, moisture, air currents, chemical composition of the soil.

In section 2 the author takes up the discussion of "Zusammenleben" and vegetable societies. For the time being I am unable to give a good English equivalent for the term Zusammenleben. By it the author wishes to indicate the interdependent relationships of plants and animals, whether organicaly united (parasitism, saprophytism, symbiotism, etc.) or merely in close proximity (such as plants and plants, animals and plants). The author's conceptions of symbiosis (in the broader sense) are somewhat original. Parasitism is considered to be the most intimate association. The form of symbiosis met with in lichens is designated as "Helotism," in which the alga is the slave. The term mutualism is made to apply to the occurrence of endotrophic and ectotrophic mycorhiza. Nothing original is added to the consideration of epiphytes and saprophytes. Lianas are included under Zusammenleben, since they were doubtless formed by their original dependence upon vegetable supports. Commensalism is used as equivalent to plant societies. According to the modifying factors the plant societies are divided into the following great groups: hydrophytes, xerophytes, halophytes and mesophytes. Each of these divisions is again subdivided. These subdivisions with their special modifying factors are quite fully discussed. On p. 125 it is stated that "pure water has a blue color," which seems to be an original idea.

The greater part of the work is devoted to the discussion of comparative vegetable morphology and physiology in connection with the modifying factors. It is a complete and well-arranged resumé of our knowledge on the subject. In conclusion there is given a brief discussion of plant struggles, weapons employed by plants in their struggles, origin of species, etc.

Considered in its entirety this is a most valuable recent contribution to the science of botany. It is a book which should be in the hands of every student. A. S.

Flora of West Virginia. By Charles Frederick Millspaugh and Lawrence William Nuttall. Field Columbian Museum, Publica-

tion 9. Botanical Series. Vol. 1: no. 2. Chicago. January, 1896.

The book before us is written in about the same style as the author's preliminary edition of 1892, but printed in much more handsome type. The introductory part is augmented by some paragraphs on the special features of the flora, the sylva, and a summary of the flora. The catalogue of species is enlarged by the intercalation of additions to the flora, new species and new varieties. A map of the State, and several illustrations are inserted, and a host index of the fungi and a list of local plant-names are appended. The authors are to be congratulated on their success in finding so many plants new to the region and new to science in such a circumscribed field. The number of plants of the present edition is recorded as 2,584 against the 1,645 of the preliminary edition. New species are described in the following genera: *Aspergillus, Botrytis, Verticillium, Fusicladium, Clasterosporium, Helminthosporium, Cercospora, Cylindrocolla, Phyllosticta, Sphaeronaema, Dothiopella, Cytispora, Sphaeropsis, Camarosporium, Septoria, Sacidium, Glocosporium, Valsa, Diaporthe, Massaria, Trematosphaeria* and *Corticium*. A hybrid between *Betula lenta* and *B. lutea* is recorded.

We note several species whose occurrence in West Virginia we are inclined to doubt, for example *Dryopteris fragrans* and *D. Filix-mas*.

The nomenclature follows the most practical rules, but we notice a most unscientific case under *OEnothera* where that genus is divided, but only the nearest relatives of the true *OEnothera* are removed, while the more distinct members (*Kneiffia*) are left under *OEnothera*, because there is a later genus *Kneiffia*, which happens to be in use!

The present catalogue is a valuable addition to local botany, but we should like to see these local works that appear from time time, in a more useful form. Why not give generic and specific keys, and at least diagnostic descriptions? J. K. S.

The Lichen-flora of Chicago and Vicinity. By W. W. Calkins. Bulletin No. 1, Geological and Natural History Survey of the Chicago Academy of Sciences. April, 1896.

The author describes 125 species distributed among 28 gen-

era as occurring in the vicinity of Chicago. The diagnoses are given in fairly good English. We are also pleased to note that no "new species" were "discovered." There is appended a fairly complete list of the publications on lichenology issued in North America previous to April 15, 1896

The paper is prefaced by a discussion of the habits and distribution of the lichens of the territory. In the discussion of "What are Lichens?" the author very clearly shows that he is somewhat behind the times. He mentions the Schwendener theory and wonders whether the theory will ever be accepted. It has been fully accepted, and is now fast giving way to a better one (Reinke's).

There is also an introduction to the development and progress of Lichenology, which is, however, too brief to be of any practical value to the student of this special group. The same may be said of his mention of "the economic uses of lichens."

Proceedings of the Club.

TUESDAY EVENING, MAY 12TH, 1896.

Mr. L. G. Fay in the chair and 12 persons present.

The Curator reported that Mr. Edward Berry has presented the Club with fifty fine specimens of plants from the country about Passaic, N. J., and other counties of the same State.

Mr. A. A. Tyler read his paper on "A Historical Review of the Study of Stipules." The author presented in a concise way the older opinions in regard to the morphology and modification of stipules. The paper was discussed by Dr. Britton and others. Subsequently Mr. Tyler made some further remarks on the origin and development of stipules.

The paper entitled "Appendages to the petioles of *Liriodendra*" by Mr. Arthur Hollick was read by title.

WEDNESDAY EVENING, MAY 27TH, 1896.

Dr. A. Schneider in the chair and 15 persons present.

Mr. John J. Schoonoven was elected an active member.

Dr. John K. Small read a paper entitled "Notes on the Flora of Yadkin Valley, N. C.," exhibiting several new species, besides many other specimens. Remarks were made by Dr. Schneider, Mr. Rydberg and others, after which followed a discussion on the growth of plants in regions which for long periods at a time are devoid of rain.

Index to recent Literature relating to American Botany.

Arechavaleta, J. Cuatro Gramineas nuevas y una Conocida de la Republica Uruguaya. Ann. Mus. Nac. Buenos Aires (II.) **4**: 177–187. *f. 1–5*. 1895.

Aristida Spegazinii, Stipa Hackeli, S. Charruana and S. latifolia described and figured as new species.

Atkinson, G. F. Albert Nelson Prentiss. Bot. Gaz. **21**: 283–289. *pl. 19. portrait.* 20 My. 1896.

Bishop, J. N. A Catalogue of all Phaenogamous and Vascular Cryptogamous Plants, at present known to grow without Cultivation in the State of Connecticut. Rept. Sec. Conn. Board Agric. **1895**. [Reprint, pp. 22. Ja. 1896].

Burkill, I. H. Teratological Observations on *Parnassia palustris*. Journ. of Bot. **34**: 12–15. Ja. 1896.

Bureau, E. and **Schumann, C.** Flora Brasiliensis. fasc. CXVIII. pp. 1–230. *pl. 69–96*. Bignoniaceae—I. 15 My. 1896.

Campbell, R. Some of the rarer summer Flowers of Canada. Can. Rec. Sci. **6**: 342–351. Ap. 1895.

Campbell, R. The Flora of Montreal Island. Can. Rec. Sci. **6**: 397–405. Jy. 1895.

Chodat, R. Conspectus systematicus generis *Monninae*. Bull. Herb. Boiss. **4**: 243–253. Ap. 1896.

Chodat, R. Plantae expeditionis Regnellianae primae in Brasilia lectae Polygalaceas. Bull. Herb. Boiss. **4**: 238–242. Ap. 1896.

New species of *Polygala*.

Chodat, R. Polygalaceae novae vel parum cognitae.—V. Bull. Herb. Boiss. **4**: 233–237. Ap. 1896.

New species of *Polygala* from South America.

Clute, W. N. Ferns and Fern Lore. Commercial Travelers' Home Mag. **6**: 271–278. 1896.

Collins, J. F. *Jasione montana* in New England. Bull. Torr. Bot. Club, **23**: 212, 213. 30 My. 1896.

Corbett, L. C. The Reproductive Powers of the Forests. Gard. & For. **9**: 234. *f. 34.* 10 Je. 1896.

Coville, F. V. Some Additions to our Vegetable Dietary. Yearbook U. S. Dept. Agric. **1895**: 205–214. Je. 1896.

Coville, F. V., and **Funston, F.** Botany of Yakutat Bay, Alaska, with a Field Report. Contr. U. S. Nat. Herb. **3**: 325–353. 15 Ja. 1896.

Cushing, H. B. On the Ferns in the Vicinity of Montreal. Can. Rec. Sci. **6**: 469–494. O. 1895.

Davenport, G. E. Filices Mexicanae—VI. Ferns collected in the States of Oaxaca, Morelos and Vera Cruz, Mexico, during the seasons of 1894 and 1895 by C. G. Pringle, of Charlotte, Vermont. Bot. Gaz. **21**: 253–265. *pl. 18.* 20 My. 1896.
New species in *Acrostichum, Aspidium* (*Dryopteris*) *Asplenium* and *Pellaea.*

Eastwood, A. *Arbutus Menziesii* in San Francisco county. Erythea, **4**: 99. 1 Je. 1896.

Eastwood, A. New Stations for two introduced Plants. Erythea, **4**: 99. 1 Je. 1896.

Eastwood, A. On Dr. Prain's Account of the Genus *Argemone.* Erythea, **4**: 93–96. 1 Je. 1896.

Fernald, M. L. *Aster tardiflorus* and its Forms. Bot. Gaz. **21**: 275–279. 20 My. 1896.
Describes a new variety and a new hybrid.

Franceschi, F. Santa Barbara exotic Flora. Pamphl. pp. 88. Santa Barbara. 1895.

Galloway, B T. Frosts and Freezes as affecting cultivated Plants. Yearbook U. S. Dept. Agric. **1895**: 141–158. Je. 1896.

Galloway, B. T. The Health of Plants in Greenhouses. Yearbook U. S. Dept. Agric. **1895**: 247–256. Je. 1896.

Ganong, W. F. An Outline of Phytobiology, etc. Second paper. Adaptation of Plants to Locomotion. Bull. Nat. Hist. Soc. New Brunswick, **13**: 3–26. 1895.

Garcke, A. Ueber einige Malvaceengattungen. Engl. Jahrb. Bot. **21**: 379–401. 11 F. 1896.

Greene, E. L. Eclogae Botanicae. No. 2. Proc. Acad. Nat. Sci. **1895**: 546–554. 1896.

New species in *Trifolium*, *Valenianella*, *Sessingia*, *Pyrocoma*, *Aster*, *Vagnera*, and a Revision of *Tropidocarpum*.

Harper, R. A. Beitrag zur Kenntniss der Kerntheilung und Sporenbildung im Ascus. Ber. Deutsch. Bot. Gesellsch. (Generalversammlungsheft) **13**: 67. 18 F. 1896.

Harper, R. A. Die Entwickelung des Peritheciums bei *Sphaerotheca Castagnei*. Ber. Deutsch. Bot. Gesellsch. **13**: 475–481. *pl. 39*. 29 Ja. 1896.

Hicks, G. H. Oil-producing Seeds. Yearbook U. S. Dept. Agric. **1895**: 185–204. Je. 1896.

Hieronymus, G. Beiträge zur Kenntniss der Pteridophyten Flora der Argentina und einiger angrenzender Teile von Uraguay, Paraguay und Bolivien. Engl. Bot. Jahrb. **22**: 359–368. 22 My. 1896.

Hieronymus, G. Plantae Steubelianae novae quas descripsit adjuvantibus aliis auctoribus (Schluss). Engl. Bot. Jahrb. **21**: 369–378. 11 F. 1896.

Hollick, A. The Tulip Tree and its Ancestors. Proc. Nat. Sci. Assn. Staten Isld. **5**: 80. My. 1896.

Holzinger, J. M. Notes an the Moss Flora of Minnesota. Bull. Geol. Nat. Hist. Surv. Minn. **9**: 590–596. 30 Ap. 1896.

Longo, B. Contributo allo studio della mucilaggine delle Cactee. Bull. Soc. Bot. Ital. **1896**: 51. F. 1896.

MacDougal. D. T. The Root-tubers of *Isopyrum occidentale*. Bot. Gaz. **21**: 280–282. *fig.* 20 My. 1896.

Macloskie, G. Observations on Antidromy. Bull. Torr. Bot. Club, **23**: 202–205. 30 My. 1896.

Massee, G. New or critical Fungi. Journ. of Bot. **34**: 145–154. Ap. 1894.

Describes *Dasyscypha Eupatorii*, *Scleroderris virescens*, *Pyrenopeziza Ellisii*, *Spragueola*, nov. gen.. with sp. *Americana*, *Hypocrella ochracea*, *Pluteus giganteus* from America.

Masters, M. T. A general View of the Genus *Cupressus*. Journ. Linn. Soc. **31**: 312–363. *f. 29*. 11 Je. 1896.

Refers *Chamaecyparis* Spach, to a subgenus.

Müller, F. Die *Bromelia silvestris* der Flora Fluminensis. Ber. Deutsch. Bot. Gesellsch. **14**: 3–10. *pl. 1*. 26 F. 1896.

Mulford, A. I. A Study of the *Agaves* of the United States. Ann. Rep. Mo. Bot. Gard. **7**: 48–100. *pl. 26–63*. 1896.

Nelson, A. First Report on the Flora of Wyoming. Bull. Wyom. Exp. Sta. 28: pp. 218. My. 1896.

Annotated list. New species and varieties proposed in *Aquilegia, Thlaspi, Oxytropis* (*Spiesia*), *Potentilla, Hymenopappus, Actinella, Mertensia.*

Paris, E. G. Index Bryologicus. (continued). Act. Soc. Linn. Bordeaux, **49**: 1–384. 1895.

Includes American species.

Penhallow, D. P. *Nematophyton Ortoni.* Ann. Bot. **10**: 41–48. *pl. 5*. Mr. 1896.

Purdy, C. Some rare *Erythroniums*. Gard. & For. **9**: 238. 10 Je. 1896.

Purdy, C. The Increase of Redwood Forests. Gard. & For. **9**: 238. 10 Je. 1896.

Reiche, K. Beiträge zur Kenntniss der Gattung *Azara*. Engl. Bot. Jahrb. **21**: 499–512. 11 F. 1896. 513. 12 My. 1896.

Robertson, C. Flowers and Insects—XVI. Bot. Gaz. **21**: 266–274. 20 My. 1896.

Insect visitors of *Nothoscordum, Camassia, Polygonatum, Smilacina, Uvularia, Trillium* and *Melanthium.*

Rogers, H. W. The Value of a Study of Botany. Ann. Rep. Mo. Bot. Gard. **7**: 113–122. 1896.

Rose, J. N. Notes upon *Tradescantia micrantha*. Bot. Gaz. **21**: 301, 302. *pl. 20*. 20 My. 1896.

Rothrock, J. T. The American Linden. Forest Leaves, **5**: 136. Je. 1896.

Illustrations are given of *Tilia Americana.*

Rowlee, W. W. and **Wiegand, K. M.** *Salix candida* Willd. and its Hybrids. Bull. Torr. Bot. Club, **23**: 194–201. *pl. 267*. 30 My. 1896.

Rydberg, P. A. Flora of the Black Hills of Dakota. Contr. U. S. Nat. Herb. **3**: 463–536. *pl. XVIII–XX*. 13 Je. 1896.

Illustrations are given of *Aquilegia brevistyla* Hook, *A. saximontana* Rydberg and *Poa pseudopratensis* Scrib. & Rydb.

Sargent, C. S. *Leucothoë recurva*. Gard. & For. **9**: 224. *f. 33*. 3 Je. 1896.

Scribner, F. L. Grass Gardens. Yearbook U. S. Dept. Agric. **1895**: 301–308. Je. 1896.

Seler, E. Reise in Mexiko. Verhandl. Gesellsch. Erdkunde, Berlin, **23**: 184–187. 1896.
One or two references to the botany of the region.

Setchell, W. A. Tendril-Structures among the Algae. Erythea, **4**: 98, 99. 1 Je. 1896.

Small, J. K. *Oenothera* and its Segregates. Bull. Torr. Bot. Club, **23**: 167–194. 30 My. 1896.
New species in *Anogra*, *Kneiffia* and *Sphaerostigma*.

Smith, J. G. Forage Conditions of the Prairie Region. Yearbook, U. S. Dept. Agric. **1895**: 309–324. Je. 1896.

Smith, Mrs. H. M. Botany of Little Moose Region. Rep. Adirondack League Club, **1896**: 54–58. 1896.
List of species noted.

Stewart, F. C. Effects of Heat on the Germination of Corn and Corn Smut. Proc. Iowa Acad. Sci. **1894**: 74–78.

Sturgis, W. C., and **Britton, W. E.** The San José Scale. Bull. Conn. Agr. Exp. Sta. 121: 6–16. *f.* 5. Jl. 1895.

Swingle, W. F., and **Webber, H. J.** Principal Diseases of Citrous Fruits in Florida. Div. Veg. Phys. and Path. U. S. Dept. of Agric. Bull. 8: 42. *pl.* 8. 1896.
Treats of Blight, Die-back (*exanthema*); Scab (*verrucosis*); Sooty-mould, Foot-rot and Melanose in a thorough manner with excellent plates.

Taubert, P. Briträge zur Kenntniss der Flora des centralbrasilianischen Staates Goyaz. Mit einer pflanzengrographischen Skizze von E. Ule. Engl. Bot. Jahrb. **21**: 402–457. *pl.* 2, 3. 11 F. 1896.

Tilden, J. E. List of Fresh-water Algae collected in Minnessota during 1895. Bull. Geol. Nat. Hist. Surv. Minn. 9: 597–600. 30 Ap. 1896.

Thaxter, R. New and peculiar aquatic Fungi.—III. Bot. Gaz. **21**: 45–51. *pl.* 3. 18 F. 1896.
Blastocladia ramosa new.

Tonduz, A. Herborizations au Costa Rica. Bull. Herb. Boiss. 3: 1–12; 445–465. 1895.

Thompson, C. H. The ligulate *Wolffias* of the United States. Ann. Rep. Mo. Bot. Gard. 7: 101–111. *pl.* 64–66. 1896.

Trelease, W. Juglandaceae of the United States. Ann. Rep. Mo. Bot. Gard. 7: 25–46. *pl.* 1–24. 1896.

Trelease, W., Editor. The Sturtevant Prelinnaean Library. Ann. Rep. Mo. Bot. Gard. 7: 123–209. 1896.

Tracy, S. M., and **Earle, F. S.** New species of Fungi from Mississippi. Bull. Torr. Bot. Club, **23**: 205–211. 30 My. 1896.

New species in *Cercospora, Cladisporium, Glonium, Helminthosporium, Lembosia, Lophodermium, Pestalozzia, Scolecotrichum, Tilletia, Ustilago, Winteria* and *Zignoella.*

Underwood, L. M. Notes on our Hepaticae.—IV. Bot. Gaz. **21**: 67–71. 18 F. 1896.

Notes on American *Fossombroniae* with synopsis.

Urban, I. Additamenta ad cognitionem florae Indiae occidentalis—III. Engl. Bot. Jahrb. **21**: 514–638. 12 My. 1896.

Urban, I. Ueber einige Ternstroemiaceen Gattungen. Ber. Deutsch. Bot. Gesellsch. **14**: 38–51. 26 F. 1896.

Vail, A. M. Studies in the Leguminosae.—I. Notes on *Meibomia.* Bull. Torr. Bot. Club, **23**: 139–141. 30 Ap. 1896.

Waghorne, A. C. The Flora of Newfoundland, Labrador and St. Pierre et Miquelon. Trans. Nov. Scot. Inst. Sci. (II.) **1**: 359–373; **2**: 17–34. 1893–95.

Ward, L. F. The Potomac Formation. Ann. Rept. U. S. Geol. Surv. **15**: 307–397. *pl. 2–4.* 1895.

New species figured, *Scleropteris Vernonensis, Zamia Washingtoniana, Camarina Covillae, Sagittaria Victor-Masori, Antholithus Gaudium-Rosae, Populus Potomacensis, P. auriculata, Celastrophyllum Hunteri.*

Warburg, O. Zur Characteristirung und Gliederung der Myristicaceen. Ber. Deutsch. Bot. Gesell. (Generalversammlungsheft) **13**: 82. *pl. 28.* 18 F. 1896.

Wainio, E. A. Lichenes Antillarum a W. R. Elliott collecti. Journ. of Bot. **34**: 66–72; 100–107; 204–209. F.–My. 1896.

Waite, M. B. The Cause and Prevention of Pear Blight. Yearbook U. S. Dept. Agric. **1895**: 295–300. Je. 1896.

Westermaier, M. A Compendium of General Botany. Translated by A. SCHNEIDER. 8vo. pp. 299. *f. 171.* New York. 1896.

Wiley, H. Notes on some North American species of *Parmelia.* Bot. Gaz. **21**: 202–206. 25 Ap. 1896.

Wiley, H. W. Soil Ferments important to Agriculture. Yearbook U. S. Dept. Agric. **1895**: 69–102. Je. 1896.

Woolson, G. A. Herb Robert. Gard. & For. **9**: 237. 10 Je. 1896.

Woods, A. F. Principles of Pruning and care of Wounds in woody Plants. Yearbook U. S. Dept. Agric. **1895**: 257–268. Je. 1896.

Contributions from the Herbarium of Columbia College.

[The numbers omitted from this list are out of print.]

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